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Contribution from the Office of Farm Management,
R. L. ADAMS, Acting Chief.

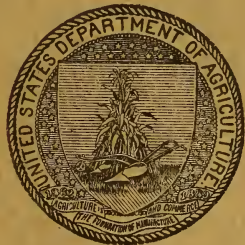
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By

C. L. GOODRICH,
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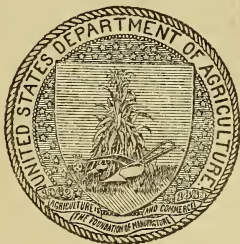
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A METHOD OF TESTING FARMS IN THE SOUTH FOR EFFICIENCY IN MANAGEMENT.

This circular is intended to present a method of testing farms for efficiency in management, with some general standards of efficiency, for the use of farm-management extension workers, county agents, farmers, and others, with special reference to agricultural conditions in the South. The method is by no means exhaustive in character, but it is expected that its use will be helpful.

Many factors influence the success of the farm business, and efficiency may be tested in numerous ways. Some of the more important tests are here given, such as (1) the production of family and farm supplies, (2) the yield per acre of crops, (3) the production per head of productive live stock, (4) the organization of the crop acreages, (5) the adjustment between labor requirements and labor supply, and (6) secondary tests directly influencing the main factors. These tests should be based on farm surveys, business summaries, and farm-practice records for the communities in which are located the farms considered. A business summary should be prepared for each farm, an average summary for all the farms in the community group, and an average summary for a given number of the best farms in the group.

With these summaries as a basis the farms should be measured individually, applying the tests in the order given, or in such order as circumstances and good judgment may suggest. In the following pages an exposition of these tests is given, with illustrative data and standards. These figures are based on prewar records and conditions, but it is thought that the principles involved will not be changed by war prices and costs.

THE TESTS.

FAMILY AND FARM SUPPLIES.

1. Is the farm producing such of the family foods as are adapted to local conditions in ample quantities for the welfare of the family?

Farm-management studies have largely ignored this test—how much of the family living is furnished directly from the farm? However, this is one of the important factors determining the amount of the income of the farm and the degree to which the farm business is safe and profitable. This is especially true of the smaller farms.

The garden and live stock which supply the larger part of the family food are usually cared for at times that interfere comparatively little with the regular farm commercial enterprises, and by labor which otherwise would not be utilized. Further, it has been found that, up to a considerable size of farm business, when the family food is produced on the farm this item, plus the fuel and shelter furnished by the farm, amounts to an equivalent of the rent for the entire farm or interest on the whole farm investment.

As an illustration, in a community in Brooks County, Ga., that makes a specialty of producing its own farm food and farm feeds, the families on 106 farms consumed in 1914 food ranging in value per family from \$104 to \$1,283 and averaging \$526. Approximately 85 per cent of this food was produced on the farms where the food was consumed. On farms having less than 75 acres of crop land, the part of the food produced on the farm amounted in value on an average to 48 per cent of the net income; and on farms having 250 acres or more of crop land the part of the food produced on the farm similarly amounted to 18 per cent of the net income. (See U. S. Dept. of Agriculture Bull. 648.)

On 149 farms pretty evenly distributed in Gaston County, N. C., Troup County, Ga., and McLennan County, Tex., the

average family consumed food to the value of \$454. Sixty-nine per cent of this food was produced on the farm.

Table I, following, taken from Farmers' Bulletin 1015, "Producing family and farm supplies on the cotton farm," presents the kind and quantity of farm foods consumed annually by the average adult person on the 255 farms mentioned in the two preceding paragraphs; two children of 12 years or under being considered equivalent to one adult:

TABLE I.—Average annual consumption of various articles of food per adult person by 250 farm families in North Carolina, Georgia, and Texas.

Article.	Amount consumed per adult person.	Article.	Amount consumed per adult person.
Vegetables:		Cereals:	
Beans.....pecks..	5.7	Corn meal.....lbs..	156
Beets.....do....	3.5	Flour.....do....	224
Cabbages.....head..	14	Sirups.....galls..	4
Cucumbers.....pecks..	2	Sugar 54 pounds = sirup,	
Melons.....number..	15	.....galls..	8.2
Onions.....pecks..	1.5	Dairy products:	
Peas.....do....	1.13	Butter	
Potatoes (Irish)...bush..	2	Buttermilk } =milk...qts..	482
Potatoes (sweet)...do....	5.11	Milk	
Sweet corn.....doz..	6.8	Beef.....lbs....	12
Tomatoes.....pecks..	4.1	Pork and lard.....do....	138
Turnips.....do....	4.5	Poultry products:	
Fruit:		Poultry.....lbs..	57.5
Apples.....bush..	1.4	Eggs.....doz....	28.4
Pears.....do....	.3		
Peaches.....do....	1.5		
Grapes.....do....	.25		
Berries.....qts...	11.5		

Until similar standards can be worked out for any community, Table I may be used as an aid in determining the approximate amount of foods to be provided for any given farm family, the number of farm animals needed to produce

the animal products, and the amount of land needed for growing the plant products. The well-managed farm will be planned for producing for home consumption garden vegetables and fruits, cereals, sirup, dairy and poultry products, and meat.

Farmers' Bulletin 1015 suggests for an average family of five adult persons, or their equivalent, a vegetable garden of two-thirds of an acre, a fruit garden of one-half acre, one-third of an acre for a winter supply of white potatoes, one-half acre for late sweet potatoes, one-half acre of sugar cane for sirup and sugar, and one acre of corn for corn meal. These items make up a total of three and one-half acres for plant products.

2. Is the farm producing the necessary feeds for the proper feeding of (a) the family live stock, (b) the farm work stock, and (c) the commercial live stock of the farm, as far as they can be produced economically under local conditions?

Farm management studies in the Southern States indicate that the most profitable farms not only produce the necessary farm feeds, but have a surplus of them to sell; and that usually on the farms producing a surplus the live stock is of better quality and is better cared for than on farms where staple feeds are bought.

FEED FOR FAMILY LIVE STOCK.

In Farmers' Bulletin 1015, a plan is suggested for providing the average farm family with animal food products, according to which there should be kept two cows, 40 fowls for furnishing eggs and poultry meat, and for each adult person or equivalent one pig should be raised annually. Enough calves should be raised to replace each cow reaching the age of 8 years. It is calculated that this family live stock will require 1 ton of corn and cob meal, 1,234 pounds of cottonseed meal, 55 bushels of corn, 40 bushels of oats, 4,200 pounds of cowpea hay, 2,100 pounds

of oat hay, 4,200 pounds of corn roughage, green forage from 2 acres, and 5 acres of pasture. At average yields for the cotton region these products will require $5\frac{1}{2}$ acres of corn, $3\frac{1}{2}$ of oats and oat hay, and 2 acres of soiling crops, making a total of 10 acres of crop land, besides the 5 acres of pasture.

FEED FOR WORK STOCK.

The work stock in the South is usually fed on grain and dry roughage during the fall, winter, and early spring. During the rest of the year this is supplemented on many farms by pasture and green feed, such as rye, sorghum, and corn. A fair provision per head of work stock would be 60 bushels of corn, 40 bushels of oats, and 3 tons of roughage; the last item may consist of $1\frac{1}{2}$ tons of cowpea hay or velvet bean hay, 1 ton of oat straw and one-half ton of corn roughage. To provide this feed at average yields will require $3\frac{1}{2}$ acres of corn, 2 of oats, 2 of cowpea hay, and 1 of pasture and green feed. (See Farmers' Bulletin 1015.)

The feeds above suggested for the family live stock and the work stock are not necessarily the best for all farms and all conditions. They are good staple feeds and are suggested as illustrating the procedure in applying this farm test. Other feeds may be substituted, according to the judgment of the person making the test or planning the farm organization.

ACRES NEEDED TO SUPPORT A 2-MULE FAMILY FARM.

On the basis of feeding suggested and at average yields per acre for the South the following acreages of food and feed crops will be required to feed properly a 2-mule family farm, averaging five adult persons or their equivalent.

TABLE II.—*Acres needed to support a 2-mule family farm.*

[Figures in parentheses are for by-products or second crops.]

Item.	Garden.	Sugar cane.	Corn with cow-peas.	Corn rough-age.	Oats and oat hay.	Cow-peas or velvet beans.	Soiling crops.	Cotton seed.	Pasture.
Vegetables	$\frac{2}{3}$	.....	.....	.....	.....	.....	.....	.....	.....
White potatoes	$\frac{1}{3}$	.....	.....	.....	.....	.....	.....	.....	.....
Sweet potatoes	$\frac{1}{2}$	.....	.....	.....	.....	.....	.....	.....	.....
Fruit	$\frac{1}{2}$	.....	.....	.....	.....	.....	.....	.....	.....
Meal for family .....	.....	.....	1	.....	.....	.....	.....	.....	.....
Sirup .....	.....	$\frac{1}{2}$	.....	.....	.....	.....	.....	.....	.....
Cows (2) .....	.....	.....	2	(9)	$1\frac{1}{2}$	(3)	2	(6 $\frac{1}{4}$)	5
Chickens (40) .....	.....	.....	2	.....	2	.....	.....	.....	.....
Hogs (5) .....	.....	.....	$1\frac{1}{2}$	.....	.....	.....	.....	.....	(5)
Work stock (2) .....	.....	.....	7	(4 $\frac{1}{2}$)	4	(4)	.....	.....	2
Total	2	$\frac{1}{2}$	13 $\frac{1}{2}$	(13 $\frac{1}{2}$)	7 $\frac{1}{2}$	(7)	2	(6 $\frac{1}{4}$)	7

Omitting by-products and second crops, the above-tabulated acreage requirements total 25 $\frac{1}{2}$ acres of crop land and 7 acres of pasture, or 12 $\frac{3}{4}$ acres of crop land and 3 $\frac{1}{2}$ acres of pasture per mule for the two-mule farm. A second crop is taken from 7 of the crop acres, and cowpeas or peanuts should be planted between the corn rows. These requirements are intended as a liberal provision for the family food and for feed for the farm live stock. In addition, there should be a surplus of garden stuff and dairy and poultry products to sell or exchange for groceries.

The foregoing acreages are calculated on the basis of average yields, which have been used by way of illustration. Many farms produce better yields than these, and those with average or less-than-average yields should better them. With higher yields the acreages above estimated can be reduced, or they can be maintained and a larger surplus sold.

COMMERCIAL ENTERPRISES.

3. Aside from providing for its own needs, are the crops and live stock the farm is producing for

sale to the nonproducers of the community or for export to other communities, such as can be made profitable when produced and sold locally or exported?

The best guide here is the practice of the community; enterprises should be adopted that are found generally on its farms. A limited demand from the nonproducers of the community for some product not generally grown locally, and for which many local farms are not adapted, will sometimes afford a few farms opportunity for expansion.

For instance, the plan suggested for providing dairy products should, if followed, produce enough surplus calves to develop here and there cattle-raising and cattle-feeding farms. Some farms will be specially adapted to this purpose by having an abundance of suitable but unsalable by-products, cheap pasture, or pasture land unadapted to cropping. Other farms may develop a considerable business in the production of pork, or of pigs for supplying farms where brood sows are not kept. An occasional farmer will develop a business of producing seeds of some particular farm crop or crops to meet the needs of those lacking suitable skill and experience for such production. Outside communities may need some product like pork, sirup, fruit, or truck, which, because of climatic or other limitations, they can not produce, but which can be provided by the local community. Such enterprises should be taken up gradually and after full investigation as to their economic value.

YIELDS PER ACRE.

4. Are the yields per acre of the farm crops satisfactory? Are they high enough to make the best possible returns for capital and labor expended in producing them?

Farm-management studies indicate that on farms of the same type and size higher yields per acre are usually accompanied by larger net incomes, and lower yields by lower net incomes.

In a group of 110 farms in Anderson County, S. C., cotton on farms yielding less than 240 pounds per acre, selling at $11\frac{1}{2}$ cents per pound in 1914, did not pay the cost of production; that is, did not pay current expenses for the crop and give a fair return for the time and labor spent on the crop and a fair rent for the land used in growing the crop. On the farms that averaged a higher yield than one-half a bale per acre the cost of production receded on an average practically 1 cent per pound for every 60 pounds increase in yield per acre. (See Dept. of Agriculture Bull. 651, A Farm Management Study in Anderson County, S. C.)

In a group of 24 farms of 50 acres or less of crop land worked by their owners in Sumter County, Ga., in 1913, 13 farms, having cotton yields of 250 pounds or less per acre, had an average farm income of \$210, a poor return for the use of the land and the farmer's time and labor; while 11, with yields of cotton of over 250 pounds per acre, had an average farm income of \$348 (Table III).

In another group of 41 farms in the same county (Table III), ranging in size from 51 to 100 acres of crop land, 15 farms having yields of 250 pounds or less of cotton per acre had an average farm income of \$447, while 26 in the same group with yields of cotton above 250 pounds had an average farm income of \$728.

In another group of 39 farms (Table III) ranging in size from 101 to 150 acres of crop land 11 farms having a cotton yield of 250 pounds per acre or less received an average farm income of \$676, while 28 with yields above 250 pounds per acre had an average farm income of \$1,306.

In still another group of 31 farms ranging in size from 151 to 250 acres of crop land 11 farms with cotton yields of 250 pounds or less per acre had an average farm income of \$1,379, while 20 with yields above 250 pounds had an average farm income of \$2,326.

These data are presented in Table III, together with some related factors.

TABLE II.—Average farm incomes on farms in Sumter County, Ga., having cotton yields of 250 pounds and under per acre and farms having cotton yields of over 250 pounds.

Size groups and yields per acre.	Number of farms.	Average yield cotton per acre.	Average farm income.	Average crop land.	Average crop land per mule.	Average percentages of crop land in cotton.
Farms of 50 acres and less of crop land:		<i>Lbs.</i>		<i>Acres.</i>	<i>Acres.</i>	
250 pounds cotton and less.....	13	202	\$210	38	23	46
Over 250 pounds cotton.....	11	355	348	29	21	46
Farms of 51 to 100 acres of crop land:						
250 pounds cotton and less.....	15	216	447	72	21	48
Over 250 pounds cotton.....	26	324	728	74	25	48
Farms of 101 to 150 acres of crop land:						
250 pounds of cotton and less.....	11	213	676	121	27	54
Over 250 pounds cotton.....	28	313	1,306	121	27	53
Farms of 151-250 acres of crop land:						
250 pounds of cotton and less.....	11	208	1,379	197	30	58
Over 250 pounds cotton.....	20	353	2,626	197	27	56

In the group of small farms averaging 29 acres of crop, an average yield of 355 pounds of cotton is required per acre to make an average farm income, barely sufficient to pay a fair rental for the use of the land and give the operator ordinary wages for his labor and management in addition to supplies furnished the family from the farm, which are not included in the farm income in this table. Not until we reach the group with an average of 121 crop acres do we find that an average yield of less than 215 pounds of cotton per acre made an average farm income sufficient for rent and farmer's wages.

It will be noted that within the size groupings acres of crop land, acres of crop land per mule, and percentages of crop land in cotton practically counterbalance; the influence of these factors is therefore eliminated from the figures showing influence of yields.

In Brooks County, Ga., the 25 best-paying farms of all sizes in a group of 110 farms yielded an average of over 315 pounds

of cotton per acre, while average yields of less than 200 pounds per acre did not pay the cost of production.

In Anderson County, S. C., it was found that the influence of yield on cost of production was just as marked with corn as it is with cotton, and that under prewar conditions corn did not pay cost of production when yields averaged less than 17 bushels per acre (U. S. Dept. of Agriculture Bull. 651). In Brooks County, Ga., it was found that corn did not pay a margin over cost of production with yields under 18 bushels (U. S. Dept. of Agriculture Bull. 648).

In all parts of the cotton country where similar studies have been made, not only with cotton and corn, but with other crops, the findings teach the principle that the general tendency is for the cost per bushel and per pound to grow less and the net income of the farm to grow greater as the number of bushels or pounds per acre increases.

5. Is the farm making special efforts toward the use of available farm manures, including the planting and growth of summer and winter catch and cover crops of small grains or legumes between the rows of cotton, corn, or other intertilled crops and on open fields and idle land to conserve and improve the fertility of the soil and thereby increase the yields of the succeeding crops?

6. Are the varieties of the crops grown on the farm the best varieties for large yields and profitable production under the existing conditions? Is special attention paid to the selection and care and testing of farm seeds, having in view perfect stands and large yields?

7. Are the methods of soil preparation and the cultivation and handling of crops in accordance with the best known practices for the region, and are they adequate for the most profitable production?

8. Is the farm making judicious use of commercial fertilizers in accordance with the best known practice for the region?

The State college of agriculture and the experiment stations should be consulted as to the best crop varieties, the best methods of selecting and caring for seeds, and the best tillage and fertilizer practice for the community.

QUALITY OF LIVE STOCK.

9. Is the quality of the farm live stock satisfactory?

This test has reference to the family live stock as well as to the work stock and stock kept expressly for commercial purposes.

It does not pay to grow low-grade or scrub stock of any kind; and there is room for improvement along this line on many cotton farms.

We have no records of the influence of production per head of live stock on farm income in the cotton States, but in a survey made in Chester County, Pa., on 289 commercial dairy farms, it was found that the 48 farms receiving \$50 and less income per cow had labor incomes 45 per cent below the general average, while 28 farms with receipts per cow of more than \$120 had labor incomes 75 per cent above the average and were the most profitable of the group.

10. Is the management of the live stock on the farm, both productive stock and work stock, in accordance with the best-known practice for the region?

Farmers' Bulletins 743, "Feeding of Dairy Cows"; 528, "Hints to Poultry Raisers"; and 874, "Swine Management," will be useful in this connection. It will be well also to consult the college of agriculture and experiment stations for advice on the kinds, breeds, and care of live stock suited to the region.

11. Aside from the family live stock and the work stock, is the farm carrying enough produc-

tive stock to consume surplus pasture and unsalable crop by-products and convert them into profitable form?

ORGANIZATION OF THE CROP LAND.

12. Are the crop acreages of the farm adjusted to each other for highly profitable production?

The efficient adjustment or organization of the crop land will depend on (a) the acreage necessary to supply the family and farm needs; (b) the economic importance of enterprises adapted to the region, particularly as to market demand and the relation of prices to costs of production and marketing; (c) the seasonal labor requirements of the enterprises; (d) the supply of labor and its cost; (e) the topography of the farm; (f) the size of the farm.

In the Southern States cotton is the predominating market crop, because of its adaptability to soil, climate, and labor conditions and to the great demand for it in regions where it can not be produced. Hence, in those parts of the cotton belt where the menace of the boll weevil and shortage of labor are not severe, and with the exception of special localities where the competition of other enterprises is strong, the procedure in testing the organization of the crop land should be as follows:

Has the farmer set aside sufficient acreage to provide well for the family and farm foods and feeds? Part of the crops grown for these purposes should be legumes for enriching the rations and improving fertility. (Consult Farmers' Bulletin 1015.)

After providing for family and farm supplies, has the farmer set aside for cotton as many acres as can be cared for properly and harvested with the available farm equipment and such outside assistance as can be relied upon?

After providing for farm needs, including fertility, and for such acreage of cotton as can be cared for well, has the remainder of the land, if there is any, been devoted to other

enterprises in the order of their importance? Such enterprises are: Increasing the acreage of food and feed crops for sale or for extending the productive live-stock enterprises; adding some other commercial enterprise, such as peanuts, or soy beans, for feed or oil; or some more intensive enterprise like sirup making or truck growing. But these added enterprises must not seriously compete with the cotton in its labor requirements or tend to diminish the fertility of the soil.

As a guide in testing the cropping system until local standards can be worked out, we may take as general standards the records from some surveys that have been made in the cotton country.

In the Sumter County, Ga., survey, previously referred to, there were nine 1-mule cotton farms operated by white owners; the best five of them averaged 23 acres of crop land per mule. Of this, 9.8 acres, or less than half, was planted to cotton. The remainder was divided as follows: 7.2 acres in corn, 2.7 in oats or oat hay, 3.6 were second-cropped with cowpea hay, leaving 3.3 acres for miscellaneous purposes. (See Table IV.)

Of twenty-three 2-mule farms the best five averaged 30.2 acres of crop land per mule. Of this, 10.6 acres were planted to corn, 3.9 to oats and oat hay, 2 acres were second-cropped with cowpea hay, 14 acres were devoted to cotton, and 1.7 to miscellaneous crops (Table IV).

Of twenty-five 3-mule farms the best five averaged 32.58 acres of crop land per mule, of which 17.47 acres were planted to cotton, the remainder going largely into food and feed crops (Table IV).

Of eighteen 4-mule farms the best five averaged 30 acres of crop land per mule; 18.85 of this went into cotton, the remainder being planted to supply crops (Table IV).

Of nineteen 5-mule farms the best five averaged 27.1 acres per mule and planted $15\frac{1}{2}$ of this in cotton (Table IV).

The best five of fifteen 6-mule farms averaged $34\frac{1}{2}$ acres of crop land per mule and planted $19\frac{1}{2}$ acres of this in cotton (Table IV).

Table IV gives the average organization per mule of the crop land for each group of five best farms and averages for the six groups. These best farms grade high in acres per mule, yields, organization, and resulting income.

TABLE IV.—*Organization of crop land per mule on 30 cotton farms in Sumter County, Ga.*

Farm groups.	Average acres of—					Average total acres of crops per mule.	Pro-ductive work-days on crops per mule.	Average farm in-come per mule.
	Cotton per mule.	Corn per mule.	Oats and oat hay per mule.	Cow-pea hay ^a per mule.	Mis-cellaneous crops per mule.			
Best five 1-mule farms.....	9.8	7.2	2.7	3.6	3.3	26.6	98	\$479
Best five 2-mule farms.....	14	10.6	3.9	2	1.7	32.2	133	353
Best five 3-mule farms.....	17.47	11.8	1.6	2	1.71	34.58	147	430
Best five 4-mule farms.....	18.85	8.5	1.73	.....	1.05	30.08	145	458
Best five 5-mule farms.....	15.5	8.1	1.9	1.32	1.18	28	124	330
Best five 6-mule farms.....	19.5	9.83	3.66	2.45	1.56	37	161	380
Average for 30 farms..	15.85	9.33	2.58	1.90	1.81	31.41	135	405

^a The cowpea hay is second crop, grown after oats or some other early crop.

By referring back to Table II it will be seen that apparently only one of the groups of best farms, that of the 1-mule farms, came near the standard set for providing for the family and farm needs. Most of the farms represented in the table could probably be made more efficient along these lines.

Some additional facts as to tilled acres per farm and per mule, per cent of land in cotton, yields of cotton and corn per acre, and the farm income are given in Table V.

TABLE V.—Average of total tilled acres, tilled acres per mule, per cent of land in cotton, yields of cotton and corn, farm income per mule, and total farm income, for 30 farms in Sumter County, Ga.

Farm groups.	Average total tilled acres per farm.	Average tilled acres per mule.	Average per cent of land in cotton.	Average yield per acre of cotton.	Average yield per acre of corn.	Average farm income per mule.	Average total farm income.
				<i>Lbs.</i>	<i>Bush.</i>		
Best five 1-mule farms	23	23	44.3	311	28.1	\$479	\$479
Best five 2-mule farms	60.4	39.2	45.7	298	15.7	353	705
Best five 3-mule farms	97.75	32.58	54.16	304	13.8	430	1,291
Best five 4-mule farms	120.3	30	61.46	321	14.6	458	1,833
Best five 5-mule farms	133.4	26.68	58.3	298	12	330	1,650
Best five 6-mule farms	207.3	34.55	56.7	284	16.6	380	2,283
Average for 30 farms . . . . .	.....	29.58	53.44	302.7	16.8	405	.....

The difference between tilled acres per mule in this table and acres of crops per mule in Table IV is the amount of land that was cropped a second time, and amounts here to the acreage in cowpeas after oats. Cowpeas planted between the rows of corn are not included in this second crop acreage.

In Brooks County, Ga., a study was made on an area of light sandy loam. In order to obtain profitable yields on this light soil, it was necessary to pay particular attention to the maintenance of soil fertility, and a system was developed which gives a smaller relative acreage to cotton and pays particular attention to legume crops and hogs. The hogs graze on wild pasture and winter grain, doing considerable harvesting of the corn and peanuts and gleaning other crop fields. Table VI gives the organization of the crop land for farm groups similar to those treated in Tables IV and V.

TABLE VI.—*Organization of crop land per mule on 30 farms in Brooks County, Ga.*

Farm crops.	Average acres of—								Average days' work on crops per mule.
	Cotton per mule.	Corn per mule.	Pea-nuts in corn per mule.	Pea-nuts per mule.	Oats and rye per mule.	Cow-pea hay per mule.	Mis-cel-lane-ous crops per mule.	Crops per mule.	
Best five 1-mule farms..	8.9	13.8	13.4	.....	1.2	0.8	1.83	26.53	97
Best five 2-mule farms..	8.1	15.5	15.4	1.5	2.25	2.05	4.42	33.82	125
Best five 3-mule farms..	12.13	11.2	7.2	1.73	7.27	7.07	3.00	42.40	134
Best five 4-mule farms..	6.55	15.85	12.9	3.5	6.3	3.85	4.31	40.36	125
Best five 5-mule farms..	9.10	13.34	8.1	.76	7.7	3.86	4.66	39.38	132
Best five 6-mule farms..	6.73	11.48	6.53	4.73	6.46	4.53	4.05	37.98	119
Average for 30 farms.....	8.57	13.53	10.59	2.04	5.20	3.69	3.71	36.74	122.3

For each mule these farms carried an average equivalent of three mature cattle, including dairy stock and sixteen 200-pound hogs, including two brood sows. It will be noticed that cotton has been reduced to about one-half the acreage on the Sumter County farms, and that corn, peanuts, hogs, and miscellaneous crops have taken a more prominent place.

Further facts relative to these Brooks County farms are given in Table VII. Among the important miscellaneous crops were watermelons, sweet potatoes, Irish potatoes, and sugar cane.

TABLE VII.—Averages of total tilled acres per farm, tilled acres per mule, percentage of tilled land in cotton and corn, yields of cotton and corn, number of hogs, and net income on groups of farms in Brooks County, Ga.

Farm groups.	Average total tilled acres per farm.	Average tilled acres per mule.	Average per cent of tilled acres in cotton.	Average per cent of tilled acres in corn.	Average yields of cotton per acre.	Average yields of corn per acre.	Average equivalent of mature hogs per mule.	Average net income per mule. ^a	Average net income per farm. ^a
					Lbs.	Bush.			
Best five 1-mule farms..	25.33	25.33	35.92	53.34	300	12	10.6	\$577	\$577
Best five 2-mule farms..	65.7	32.87	27.51	45.51	318	15	18.5	555	1,112
Best five 3-mule farms..	109.1	36.29	33.89	31.27	302	14	17.8	581	1,742
Best five 4-mule farms..	144.6	36.15	17.9	43.67	324	14	17.3	514	2,056
Best five 5-mule farms..	175.8	33.16	28.32	37.58	299	13	14.8	490	2,448
Best five 6-mule farms..	199.2	33.2	20.74	34.73	323	14	17	427	2,561
Average for 30 farms	.....	32.83	27.4	41.0	311	13.7	16	524	.....

^a Net income includes what the farm furnished the family.

LABOR UTILIZATION.

13. Are the labor requirements of the productive enterprises of the farm as organized sufficient to make the best utilization of the work-stock equipment necessary to operate the farm?

As a measure for this test, we may use the experiences of the more successful farms of the type in the community.

For example, turning back to Tables IV and V, we find that on the best one-mule farms in the Sumter County community an average of 27 acres of crops on 23 acres of crop land were worked with one mule. Therefore we should expect that the mule requirements on farms of this type that have less than 23 acres of tilled land or 27 acres of crops are not sufficient to utilize properly the labor of the one mule necessary to operate the farm.

Likewise, on the best two-mule farms of the community, 60 acres of crop land and 64 acres of crops were worked with a two-mule equipment, and we should expect that the mule-labor requirement on farms of this type that have less than 60 acres of crop land or 64 acres of crops are not sufficient to utilize properly the labor of a two-mule farm.

By the same reasoning we should expect that the labor requirements of a farm of this type of less than 98 acres of crop land, or 104 acres of crops, would not be sufficient to use the labor of three mules with the best efficiency, and so on, with the larger mule equipments.

For farms of the Brooks County type, as shown in Tables VI and VII, anything smaller than 25 acres of crop land or 26½ acres of crops for a one-mule farm, 66 tilled acres for a two-mule farm, 109 acres of crop land or 127 acres of crops for a three-mule farm would not have labor requirements sufficient to utilize properly the work-stock equipment necessary to operate them.

While these figures represent the averages of the best farms in the various groups, and make an excellent and conservative guide, they do not represent the highest possible efficiency. For instance, in the group of the five best three-mule farms in Sumter County, there was one farm on which each mule worked an average of 20 acres of cotton, 16⅔ acres of corn, 1⅓ acres of oats, followed by 1½ acres of cowpea hay, and 1.41 acres of miscellaneous crops, or a total of 40.71 acres of crops per mule, and each mule worked an average of 187 days, which is a very good average, considering that there are about 230 days in the year available for crop work in this region.

With a cotton yield of 290 pounds per acre, the farm income of this farm was \$632 per mule, or \$1,896 for the three-mule farm.

If it is found that the labor requirements of the farm are not sufficient to reach high efficiency in utilizing the available time of the work-stock equipment necessary to operate the farm, is it possible to bring into use idle tillable land, to reclaim wild

land, or to rent additional land and thus increase the efficiency of the farm labor and equipment?

14. Is the present equipment of work stock sufficient to operate the farm efficiently?

As a measure for this test, we may again use Tables IV, V, VI, and VII, or similar tables compiled for the community in which the farm is located.

If it is found that the work-stock equipment is not sufficient to operate properly the farm, is it possible to add more work stock or by renting out a few acres bring the farm to a size that can be operated efficiently by the present outfit?

15. Are the man-labor requirements of the productive enterprises of the farm as organized sufficient to make the best utilization of the time of the regular men necessary to operate the farm?

As a basis for this test we may use the experience of the best farms of the community. For illustration and general standards we may take the Sumter and Brooks County, Ga., groups of best farms.

On the southern farms one or more men are occupied regularly in management, and work the entire year. Other laborers or members of the family are employed to work by the acre, by the hundredweight of crop, or by the day, at such work as chopping and hoeing, picking cotton, or other miscellaneous work, and are paid for the actual time employed.

Available days.—If from the total number of days in each month we deduct Sundays, holidays, rainy days, and other days not suited for field work, we get a set of numbers which represent the days in each month that are available for field work on the farm. The sums of these numbers will be the total number of days available for field work during the year.

If we add together the number of available days for each regular man on the farm for the time he is employed we will have the total time available for regular field work. For ex-

ample, the following days per month were found to be available for field work in Sumter County, Ga.

TABLE VIII.—*Days available for field work per month in central Georgia.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Days available.....	16	15	19	19	21	20	21	21	20	20	20	18	230

A man working the entire year will be able to work in the field 230 days, provided there is sufficient work to keep him busy, and a man working seven months, from January 1 to July 31, will be able to work in the field 132 days, if that much work is provided for him.

Table IX gives the same data for communities in southern Georgia :

TABLE IX.—*Days available for field work per month in southern Georgia.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Days available.....	18	18	20	22	21	20	20	21	22	22	22	19	245

One man working the entire year and two men working six months each from January 1 would be able to do a total of 433 days of field work, an average of 161 days per man, provided there was that much work to be done.

Work days required.—If on a given farm we find the number of days necessary to do the contract and miscellaneous day wage work and subtract the amount from the total number of days' work required by all the productive enterprises, the remainder will be the number of productive days' work required of the regular men of the farm.

If we divide this number of productive days' work required of the regular men of the farm by the number of days available

for field work at their command, we will get a number expressing the percentage of efficiency with which their time has been utilized.

For example, the group of five best 4-mule farms in the Sumter County community (see Tables IV, V, and X) has an average of 4.8 regular men per farm. These men had a total of 1,016 days available for field work. There was a total of 1,184 days' work required by the productive enterprises. Of these, 512 were cared for by contract and miscellaneous hired and family labor, leaving 671 days for the regular men. This means 212 days available per regular man, of which 140 days, or 68 per cent, were required for and utilized on productive enterprises.

Table X gives the average number of men, the days available per regular man, the number of days' work required per regular man on productive enterprises, and the per cent of the time utilized on the groups of best farms in the Sumter County community.

TABLE X.—*Utilization of regular man labor on groups of farms in Sumter County, Ga.*

[Average figures.]

Farm groups.	Regular men per farm. ^a	Days per regular man.		Per cent of available time used on productive enterprises.
		Available for field work.	Work on productive enterprises required. ^b	
	<i>Men.</i>	<i>Days.</i>	<i>Days.</i>	<i>Per cent.</i>
Best five 1-mule farms.....	1.2	218	94	43
Best five 2-mule farms.....	2.4	217	115	53
Best five 3-mule farms.....	4.2	177	118	67
Best five 4-mule farms.....	4.8	212	140	66
Best five 5-mule farms.....	5	205	135	65
Best five 6-mule farms.....	7	192	143	74
All farms.....		204	124	61.3

^a Operators, croppers, and men employed by the month for a whole or part of the year. Two hundred and thirty days in the year are available for field work for a man on the farm the entire year.

^b This figure is found by deducting cotton picking and other contract and miscellaneous family and hired labor performed on the enterprises from the total man labor requirements of the enterprise and dividing the remainder by the number of regular men.

Table XI gives the same facts for the groups of best Brooks County farms.

TABLE XI.—*Utilization of regular man labor on groups of farms in Brooks County, Ga.*

[Average figures.]

Farm groups.	Regular men per farm. ^a	Days per regular man.		Per cent of available time used on productive enterprises.
		Available for field work.	Work on productive enterprises required. ^b	
	<i>Men.</i>	<i>Days.</i>	<i>Days.</i>	<i>Per cent.</i>
Best five 1-mule farms.....	1	243	115	47
Best five 2-mule farms.....	2.4	220	144	65
Best five 3-mule farms.....	3.4	203	147	72
Best five 4-mule farms.....	4.2	170	119	70
Best five 5-mule farms.....	5.4	192	140	73
Best five 6-mule farms.....	5.5	187	136	73
All farms.....		202.5	133.7	66.7

^a Operators, croppers, and men employed by the month for a whole or part of the year. Two hundred and forty-five days in the year are available for field work for a man on the farm the entire year.

^b This figure is found by deducting cotton picking and other contract and miscellaneous family and hired labor performed on the enterprise from the total man-labor requirements of the enterprise and dividing the remainder by the number of regular men.

These figures give us an idea of what may be expected in the utilization of regular man labor on well-organized farms like those considered in Tables IV and VII in the regions where those farms are located.

Under test 13 (p. 19) the measures of mule labor utilization suggested are the number of acres of crop land and the number of acres of crops worked per mule.

Under test 15 (p. 21) the measure of labor utilization employed is a percentage figure representing the relation of the total number of days' work required per regular man to the number of days available for field work per regular man.

In checking up the influence of organization on labor efficiency it may sometimes be desirable to compare the labor available with that required by months or fractions of a month throughout the year. Such a comparison will show in what months, if any, the labor is not fully utilized, and will serve as a guide in readjusting the acreages of the enterprises, in extending the present organization over more acres, or in adding other enterprises. For such monthly comparisons of the labor required and the labor available it will be necessary to determine for the individual farm or for the farm communities:

1. The number of days in each month on which labor can usually be performed after deducting Sundays, holidays, rainy days, and days when the soil is not in condition to work.

2. The average practice in working the crops and the labor required per acre for the farm in question or for the region.

3. The distribution of this labor by months or fractions of a month throughout the year.

By way of example the above data for central Georgia are given in Tables XII, XIII, XIV, and XV.

TABLE XII.—*Number of days available for field work per month in central Georgia.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Days available.....	16	15	19	19	21	20	21	21	20	20	20	18	230

TABLE XIII.—*Field practice and labor requirements for some crops in central Georgia.*

Operation.	Sweet potatoes.		Sugar cane.		Sorghum.		Corn.		Cotton.	
	Man days.	Horse days.	Man days.	Horse days.	Man days.	Horse days.	Man days.	Horse days.	Man days.	Horse days.
Cut stalks, clean land.....			0.10	0.20	0.11	0.22	0.11	0.22	0.12	0.24
Break.....	0.65	1.25	.59	1.28	.50	1.05	.50	1.05	.67	1.40
Bed seed.....	.25									
Harrow.....	.14	.28	.06	.16	.16	.47	.16	.47	.19	.40
Bed.....			.64	.99	.20	.36	.20	.36	.46	.53
Fertilize.....	.94	.80	.53	.35	.14	.13	.14	.13	.20	.20
Plant.....	1.50		.35		.06	.07	.06	.07	.16	.16
Harrow and cultivate.....	1.88	1.02	1.72	1.72	.95	1.18	.95	1.18	1.42	1.54
Chop, hoe, thin.....	1.29		.80						1.30	
Cut green and haul.....					.50	.50				
Strip fodder.....							.93			
Strip, cut, and haul.....			7.06	.99						
Pick and haul to gin.....									6.70	.56
Harvest and market.....	3.00	1.34					.70	.35	.06	.13
Grind and evaporate.....			3.50	1.50						
Bank seed cane.....			.40							
Total.....	9.65	4.69	15.75	7.19	3.62	3.98	3.75	3.83	11.28	5.16

TABLE XIV.—*Field practice and labor requirements for some crops in central Georgia.*

Operation.	Fruit.		Peanuts.		White potatoes.		Oats and rye.		Cowpea hay.	
	Man days.	Horse days.	Man days.	Horse days.	Man days.	Horse days.	Man days.	Horse days.	Man days.	Horse days.
Break.....	0.52	0.50	0.60	0.80	0.60	1.20	0.59	1.66	0.29	0.44
Seed.....									.07	.03
Harrow.....						.20	.40		.10	.20
Cut seed.....					1.00					
Lay off.....			.20	.20	.30	.30				
Fertilize.....	.23	.09			.86	.70		.25	.09	
Plant.....			.80	.20	1.50	.50				
Cultivate.....	1.10	1.52	.80	.80	1.24	1.24				
Hoe.....			1.10		1.00					
			^a 3.50	^a 2.00						
Spray.....	1.18	.75			.25	.25				
Dig, gather, haul.....	4.89	.92			2.79	1.50				
Pull, bunch, haul.....			1.60	.70						
Cut, shock, rake.....							.40	.30	.22	.35
Haul, thrash.....							.31	.23	.37	.28
									^b 1.05	^b 1.30
Prune.....	.58	.68								
Whitewash.....	.37	.07								
Dig borers.....	.45									
Bale.....									.70	.31
Total.....	9.32	4.53	5.10	2.70	9.74	6.09	1.55	2.28	1.75	1.61

^a Total for peanuts hogged off.^b Total for cowpea hay not baled.

TABLE XV.—Distribution by months of the average number of days of man labor and horse labor expended in growing 1 acre of each of the following crops in central Georgia.

Crops.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.
Vegetables:													
Man.....days..	0.50	0.73	2.06	2.07	2.42	1.85	1.84	1.81	1.77	1.59	0.20	.....	16.84
Horse.....do....	.39	1.01	1.85	1.45	1.05	.69	.90	.80	.63	.55	.....	.....	9.32
Fruit:													
Man.....do....	1.44	.44	.....	.29	1.19	3.00	.99	.....	.....	.07	.54	1.36	9.32
Horse.....do....	1.04	.42	.....	.18	.36	.56	.18	.....	.....	.08	.60	1.11	4.53
Sweet potatoes:													
Man.....do....	.64	.39	.61	.97	1.78	2.33	.57	.....	.....	.97	.75	.64	9.65
Horse.....do....	.26	.75	.70	.62	.55	.44	.29	.....	.....	.46	.36	.26	4.69
Late white potatoes:													
Man.....do....	.....	.....	.....	.....	.....	.....	2.10	3.58	1.27	.70	2.09	.....	9.74
Horse.....do....	.....	.....	.....	.....	.....	.....	1.55	2.27	.82	.50	1.00	.....	6.14
Sugar cane:													
Man.....do....	.43	.64	.99	.19	1.37	.79	.33	.....	.....	2.75	8.21	.....	15.75
Horse.....do....	.93	1.04	.73	.33	.57	.72	.38	.....	.....	.33	2.16	.....	7.19
Sorghum fed green:													
Man.....do....	.20	.25	.29	.31	.51	.59	.50	.50	.50	.....	.....	.19	3.62
Horse.....do....	.42	.59	.56	.39	.62	.55	.12	.12	.12	.....	.....	.47	3.96
Corn:													
Man.....do....	.20	.25	.29	.34	.51	.34	.....	.93	.....	.35	.35	.19	3.73
Horse.....do....	.42	.59	.56	.39	.62	.43	.....	.....	.....	.17	.18	.47	3.85
Oats:													
Man.....do....	.....	.....	.09	.....	.13	.42	.16	.....	.38	.37	.....	.....	1.55
Horse.....do....	.....	.....	.....	.....	.10	.31	.12	.....	.88	.87	.....	.....	2.28
Cow peas for hay:													
Man.....do....	.....	.....	.....	.....	.....	.30	.16	.....	.38	.21	.....	.....	1.09
Horse.....do....	.....	.....	.....	.....	.....	.44	.23	.....	.42	.21	.....	.....	1.30
Peanuts hogged off:													
Man.....do....	.....	.....	.....	.....	1.60	1.90	.....	.....	.....	.....	.....	.....	3.50
Horse.....do....	.....	.....	.....	.....	1.35	.65	.....	.....	.....	.....	.....	.....	2.00
Cotton:													
Man.....do....	.38	.31	.33	.63	1.27	1.05	.32	.....	2.11	2.32	2.32	.24	11.28
Horse.....do....	.79	.64	.43	.68	.54	.57	.34	.....	.18	.20	.19	.60	5.16

With data similar to the above in hand, a farm organization can be tested in detail for its efficiency in utilizing the labor of man and horse equipment necessary for its operation. The following example is given by way of illustration:

A certain farm in central Georgia has 59.5 acres of crop land, 65 acres of permanent tillable pasture land, 10 acres occupied by buildings, roads, and waste, and 178 acres of woods. The family on this farm consists of 5 adults and 5 children under 16 years of age, or an equivalent of $7\frac{1}{2}$ adults.

In 1914 the live stock on this farm consisted of 2 mules, 2 cows, 6 head of young stock, 2 brood sows, 12 pigs and shoats, 59 poultry, and 20 stands of bees.

The crop land was divided as follows: $\frac{1}{4}$ acre of garden, 1 acre of sweet potatoes, $\frac{1}{4}$ acre of sugar cane, 30 acres of corn, 10 acres of oats and rye followed by 8 acres of cowpeas and velvet beans for hay, 4 acres of peanuts for hogs, and 14 acres of cotton.

Table XVI gives the mule labor available and the mule labor requirements of these crops by months. The first line of this table gives the days of mule labor available each month from 2 mules. These amounts are found by multiplying the number of days available for field work in each month in Table XII by 2, the number of mules.

Then follows the number of mule days required each month by the crops of this farm on the basis of average practice for the region. These figures are found by multiplying the acre requirements of the crops for each month in Table XV by the number of acres of the crop grown.

The total requirement of the $59\frac{1}{2}$ acres of crop land or $67\frac{1}{2}$ acres of crop for each month is then subtracted from the labor available for that month, and in the last line is found the number of unused mule days for each month.

TABLE XVI.—Mule labor data on a farm in central Georgia.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Days of mule labor available from 2 mules.....	32.00	30.00	38.00	38.00	42.00	40.00	42.00	42.00	40.00	40.00	40.00	36.00	460.00
Days of mule labor required by crops:													
Garden vegetables, $\frac{1}{2}$ acre.....	.10	.25	.46	.36	.26	.17	.23	.20	.16	.14	.....	.....	2.33
Sweet potatoes, $\frac{1}{2}$ acre.....	.26	.75	.70	.62	.55	.44	.29	.....	.....	.46	.36	.26	4.69
Sugar cane, $\frac{1}{2}$ acre.....	.23	.26	.18	.08	.11	.18	.19	.....	.....	.08	.51	.....	1.79
Corn, 30 acres.....	12.60	17.70	16.80	11.70	18.60	12.90	1.20	.....	.....	3.10	5.40	14.10	114.90
Oats and rye, 10 acres.....	.....	.....	.....	.....	1.00	3.40	1.20	.....	.....	8.80	8.70	.....	22.80
Cowpeas and velvet bean hay, 8 acres.....	.....	.....	.....	.....	.....	3.52	1.84	.....	.....	3.36	.....	.....	10.40
Peanuts, $\frac{1}{2}$ acres.....	.....	.....	.....	.....	5.40	2.60	.....	.....	.....	.....	.....	.....	8.00
Cotton, 14 acres.....	11.06	8.96	6.02	9.52	7.56	7.98	4.76	.....	.....	2.80	2.66	8.40	72.44
Total required (for crop land, 59 $\frac{1}{2}$ acres; acres of crops, 67 $\frac{1}{2}$)	24.25	27.92	24.16	22.28	33.51	30.89	8.42	.20	14.84	18.96	8.96	22.75	237.15
Remaining mule labor (days)	7.75	2.08	13.84	15.72	8.49	9.11	33.58	41.80	25.16	21.01	31.04	13.21	222.85
						66.90				132.28			

This farm is working $29\frac{3}{4}$ acres of land per mule, on which it grows $33\frac{3}{4}$ acres of crops per mule. This is considerably above the average, but is using only 52 per cent of the mule days available for field work.

The available mule labor for February is pretty well used up, but during the three soil-preparation months of January, February, and March there is a surplus of 24 mule days. In the planting and cultivation months there are 67 days, and during the remainder of the year there are 132 days not used, making a total of 232 mule days, or 48 per cent of the total available mule days still to be used if desired and conditions permit.

According to the standards set up in test 1 (p. 4), this 2-mule farm, with a family of $7\frac{1}{2}$ adults or their equivalent, should provide for home use 1 acre of garden vegetables, $\frac{3}{4}$ acre of fruit, $\frac{1}{2}$ acre of late white potatoes, $\frac{3}{4}$ acre of sweet potatoes, and $\frac{3}{4}$ acre of sugar cane. The record of the farm shows that there was $\frac{1}{4}$ acre of garden, no fruit, 1 acre of sweet potatoes, and $\frac{1}{4}$ acre of sugar cane.

So, by way of illustration, suppose that in the way of reorganization we add to the crops of this farm $\frac{3}{4}$ acre of garden vegetables, $\frac{3}{4}$ acre of fruit, and $\frac{1}{2}$ acre of white potatoes. The farm was planting plenty of sweet potatoes and had 20 stands of honey bees to supply sweets in addition to the $\frac{1}{4}$ acre of sugar cane; therefore we will not increase the sweet-potato and sugar-cane area.

The family live stock on this farm is ample for family needs, as the records show some butter sales from the two cows, sales of eggs from the flock of 59 head of poultry, and some sales of meat from the 12 pigs and shoats on hand at the beginning of the year. According to approximate standards suggested under test 2 (p. 6), this live stock will require the acreage of crops indicated in Table XVII.

TABLE XVII.—*Acres of crops needed to feed the indicated farm live stock.*

[The parentheses indicate a second product, second crop, or double use of the land.]

Kind of live stock.	Corn.	Corn rough- age.	Oats and oat hay.	Cow- pea hay.	Soil- ing crops.	Pas- ture.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
2 cows.....	2	(9)	1.5	(3)	2	5
6 young stock.....	3	(8.5)	3.5	(4)	.....	7
59 poultry.....	3	.....	3	.....	.....	.....
2 brood sows.....	2	.....	.....	.....	.....	.....
12 pigs and shoats.....	3.5	.....	.....	.....	.....	(14)
2 mules.....	7	(4.5)	4	(4)	.....	2
Family meal.....	1.5	.....	.....	.....	.....	.....
Total.....	22	(22)	12	(11)	2	14

In the way of live-stock feed crops, the farm has planned for 30 acres of corn, 10 acres of oats and rye, 8 acres of cowpea and velvet bean hay and 65 acres of pasture. It has also provided 4 acres of peanuts for hog grazing. On the basis of the standards proposed in test 2, the stock requirements of this farm, as worked out in Table XVII, call for 2 more acres of oats, 3 more acres of cowpea hay, and 2 acres of sorghum for green feed. There is also a surplus of 8 acres of corn, for which other crops may be substituted, if desired.

The mule labor required by the additional family food crops and live-stock feed crops needed to meet the standards given are found in Table XVIII (p. 35). In the first line of that table are given the amounts of mule labor not used, as shown in Table XVI. Then follow the labor requirements of the additional maintenance crops in lines 2 to 7. The total requirements of these crops by months in line 8 are subtracted from the surplus mule labor, shown in the first line. The remainders in line 9 show a shortage of nearly one-fifth of a day in February, but there is sufficient surplus in January and March to take good care of this, as the work in these months is not definitely fixed as to time and can be shifted.

Now, suppose we discard the surplus 8 acres of corn not needed for the farm feed and add the labor of these 8 acres to the mule labor that remains in line 9. In line 11, the totals resulting from these additions, will be found new monthly amounts of mule labor still available, and it is proposed that the most of this labor be utilized in growing more cotton, the principal commercial crop of the region.

We find the smallest amount of surplus mule labor in February, namely, 4.54 days. This divided by 0.64 days, the mule labor required for 1 acre of cotton in February, as found in Table XV, would limit us to not more than 7 acres. However, the labor during the three preparation months of January, February, and March is not definitely fixed as to time, and by shifting the work we can handle a larger acreage. It might be possible to handle 15 acres with the 28 days available for the three months. This number of acres might also possibly be taken care of in the month of June, which has the lowest amount of surplus mule labor in the planting and cultivation months. In both instances, however, we would be running on a very narrow margin, so we will proceed on the basis of adding 10 acres of cotton to use this surplus labor.

The labor requirements of the additional 10 acres of cotton are found in line 12 of the table. Subtracting these amounts from the available amounts in line 11, we still have a surplus of mule labor as shown in line 13. This surplus is largest in the last half of the year. It will be desirable, therefore, to add some crop that will use labor during the latter part of the year. Referring to Table XV, we find that we have such a crop for this region in late white potatoes, and it is proposed that we add $3\frac{1}{2}$ acres of this crop. Also, as this crop occupies the ground only in the latter part of the year, it will be desirable to occupy the land during the early part of the year with some crop that does not require much spring and summer handling. We find such a crop in oats or rye, which may be grown for grain, for green feed, or for grazing, or to be turned under for soil improvement.

The one-half acre of white potatoes for family use, with the $3\frac{1}{2}$ now under consideration for market purposes, will require 4 acres of oats to precede them. We have 1 acre of the 12 acres of oats provided for the live stock that has no crop after it, so we will need 3 additional acres of oats.

The monthly labor requirements of the 3 acres of oats and the $3\frac{1}{2}$ acres of potatoes appear in lines 14 and 15 of Table XVIII and the monthly sums in line 16. These amounts taken from the available time in line 13 still leave a good working surplus of mule labor.

TABLE XVIII.—*Adjustment of crops to use surplus mule labor.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Mule labor not used (days).....(1)	a7.75	a2.08	a13.84	15.72	8.49	9.11	33.58	41.80	25.16	21.04	31.04	13.24	222.85
<i>Crop requirements of—</i>													
Garden vegetables, $\frac{3}{4}$ acre.....(2)	0.29	0.76	1.39	1.09	0.79	0.52	0.68	0.60	0.47	0.41	0.41	0.45	0.83
Fruit, $\frac{3}{4}$ acre.....(3)	.78	.32	.....	.14	.27	.42	.14	.....	.....	.06	.....	.....	.....
Late white potatoes, $\frac{1}{2}$ acre.....(4)	.....	.....	.....	.....	.....	.78	.41	1.14	.41	.25	.50	.....	.....
Oats, 2 acres.....(5)	.....	.....	.....	.....	.20	.62	.24	.....	1.76	1.74	.....	.....	.....
Cowpea hay, 3 acres.....(6)	.....	.....	.....	.....	.....	1.32	.69	.....	1.28	.63	.....	.....	.....
Sorghum, 2 acres.....(7)	.84	1.18	1.12	.78	1.24	1.10	.24	.24	.21	.....	.....	.94	.....
Totals.....(8)	1.91	2.26	2.51	2.01	2.50	3.98	2.67	1.98	4.14	3.09	.95	1.77	.....
Subtract line (8) from line (1):													
Mule labor remaining.....(9)	5.64	-.18	11.33	13.71	5.99	5.13	30.91	39.82	21.02	17.95	39.09	11.47	.....
Mule labor for 8 acres discarded corn... (10)	3.36	4.72	4.48	3.12	4.50	3.44	.....	.....	.....	1.36	1.44	3.76	.....
Total mule labor in lines (9) and (10).....(11)	a9.00	b4.54	b15.81	16.83	10.49	8.57	30.91	39.82	21.02	19.31	31.53	15.23	.....
Cotton, 10 acres.....(12)	c7.90	c6.40	c4.35	6.80	5.40	5.70	3.40	.....	1.80	2.00	1.90	6.00	.....
Subtract (12) from (11):													
Remaining mule labor.....(13)	(d)	(d)	(d)	10.03	5.09	2.87	27.51	39.82	19.22	17.37	26.63	9.23	.....
Oats, 3 acres.....(14)	.....	.....	.....	.....	.30	.93	.36	.....	2.64	2.61	.....	.....	.....
Late white potatoes, 3.5 acres.....(15)	.....	.....	.....	.....	.....	5.43	7.94	.....	2.87	1.75	.....	.....	.....
Total of (14) and (15).....(16)	.....	.....	.....	.....	.30	.93	5.79	7.94	5.51	4.36	3.50	.....	.....
Remaining mule labor (days); subtract (16) from (13).....	(d)	(d)	(d)	10.03	4.79	1.94	4.72	31.88	13.71	12.95	26.13	9.23	125.59

a Total for January, February, and March, 23.17.

b " " " " " " 28.81.

c " " " " " " 18.60.

d " " " " " " 10.21.

Our reconstructed crop system now stands as follows: Garden vegetables, 1 acre; fruit, $\frac{3}{4}$ acre; late white potatoes, 4 acres; sweet potatoes, 1 acre; sugar cane, $\frac{1}{4}$ acre; sorghum, 2 acres; corn, 22 acres; oats, 15 acres; cowpea hay, 11 acres; peanuts, 4 acres; cotton, 24 acres; or 70 acres of crop land and 85 acres of crops. This is 35 acres of crop land and $42\frac{1}{2}$ acres of crops per mule, as compared with $29\frac{1}{4}$ acres of crop land and $33\frac{1}{4}$ acres of crops per mule as originally organized, and we are using 72 per cent of the mule labor as compared with 52 per cent under the old organization.

As reorganized, these crops can be arranged in a 4-field, 4-year rotation, as follows:

Field 1. 17 acres of cotton.

Field 2. 12 acres of corn with cowpeas, 4 acres of peanuts, 1 acre of sweet potatoes.

Field 3. 7 acres of cotton, 10 acres of corn with cowpeas.

Field 4. 15 acres of oats, followed by cowpeas and potatoes, 2 acres of sorghum.

This rotation does not include the vegetable garden, the fruit, and the sugar patch, which will not very well fit into the rotation.

This reorganization is worked out on the basis of mule labor being the main limiting factor. We have assumed that all the crops, including the additional cotton, can be handled by the family with such additional outside man labor as is available. It has been possible to extend the total acreage of crop land because of the large acreage of tillable pasture, which was in excess of live-stock needs.

Had there been no surplus tillable land on which to extend the crop area, it would be necessary to rent additional land until some of the woodland could be cleared or more land bought. Had no additional crop land been available, changes in the organization could have been made only by reducing acreages of some of the crops to make room for increasing the acreages of others or for adding new crops.

The reorganization worked out here is not suggested as the best one for this farm. Others might have been presented, but this has been given simply to illustrate a method of testing and changing organization for efficiency in the use of mule labor. The effect of organization on efficiency in the use of man labor may be worked out in the same manner.

WORKING CAPITAL.

16. Is the working capital per mule adequate for efficient operation of the farm?

Here again the averages for the best farms of the community may be used as a measure in this test.

Tables XIX and XX give by way of illustration the working capital per mule and per farm and its distribution to live stock, implements and machinery, feed and supplies, and cash to run the farm, in the Sumter County and Brooks County farm communities, and as general standards for the regions in which these communities are located.

TABLE XIX.—*Distribution of working capital, working capital per mule, and working capital per farm on groups of Sumter County, Ga., farms.*

Farm groups.	Average value of—				Average cash to run farm per mule.	Average total working capital per mule.	Average total working capital per farm.
	Work stock per mule.	Pro-ductive live stock per mule.	Imple-ments and ma-chin-ery per mule.	Feed and sup-plies per mule.			
Best five 1-mule farms.....	\$185	\$53	\$63	\$34	\$115	\$450	\$450
Best five 2-mule farms.....	195	79	68	140	115	597	1,194
Best five 3-mule farms.....	160	57	51	108	145	521	1,563
Best five 4-mule farms.....	196	43	54	102	114	509	2,036
Best five 5-mule farms.....	163	30	43	109	158	503	2,515
Best five 6-mule farms.....	108	23	60	93	93	382	2,292
Average for 30 farms.....	168	48	56	99	123	494	.....

TABLE XX.—*Working capital per farm and per mule, and its distribution to work stock, productive live stock, implements and machinery, feed and supplies, and cash to run the farm for groups of farms in the Brooks County, Ga., community.*

Farm groups.	Average value of—				Average cash to run farm per mule.	Average total working capital per mule.	Average total working capital per farm.
	Work stock per mule.	Productive live stock per mule.	Implements and machinery per mule.	Feed and supplies per mule.			
Best five 1-mule farms.....	\$136	\$95	\$40	\$206	\$11	\$478	\$478
Best five 2-mule farms.....	152	141	116	207	10	626	1,252
Best five 3-mule farms.....	159	109	106	192	25	591	1,773
Best five 4-mule farms.....	171	100	87	212	34	604	2,416
Best five 5-mule farms.....	217	90	87	167	20	581	2,905
Best five 6-mule farms.....	168	103	87	151	60	569	3,414
Average for 30 farms.....	167	106	87	189	26	575	.....

The tests and examples given in the foregoing pages deal with the most important and fundamental factors that influence efficiency in the management of the farm, and they are sufficient to illustrate the method suggested and also to give some general standards for use in the South until standards can be established for local communities.

OTHER TESTS.

Other tests may follow, dealing with the various items of expense, the sources of income, farm practice in caring for crops and live stock, the organization of the farm land as a whole, the size, shape, and general layout of the crop land with reference to greater efficiency in the use of labor and machinery, the location and plan of the farm buildings with reference to sanitation and convenience, and the saving of time and labor, and so on in as great detail as may be desired.

PUBLICATIONS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE RELATING TO FARM MANAGEMENT.

- Building up a Run Down Cotton Farm. Farmers' Bulletin 326.
A Profitable Cotton Farm. Farmers' Bulletin 364.
Replanning a Farm for Profit. Farmers' Bulletin 370.
What the Farm Contributes Directly to the Family Living. Farmers' Bulletin 635.
An Example of Intensive Farming in the Cotton Belt. Farmers' Bulletin 519.
A System of Farm Cost Accounting. Farmers' Bulletin 572.
A Method of Analyzing the Farm Business. Farmers' Bulletin 661.
Waste Land and Wasted Land on the Farm. Farmers' Bulletin 745.
Soy Beans in Systems of Farming. Farmers' Bulletin 931.
How Live Stock is Handled in the Blue Grass Region of Kentucky. Farmers' Bulletin 812.
Making Hay on Trucks. Farmers' Bulletin 956.
Systems of Hog Farming in the Southeastern States. Farmers' Bulletin 985.
Farm Practices that Increase Crop Yields in the Gulf Coast Region. Farmers' Bulletin 986.
Farm Practices that Increase Crop Yields—Kentucky and Tennessee. Farmers' Bulletin 981.
Cropping Systems for Arkansas. Farmers' Bulletin 1000.
Producing Family and Farm Supplies on the Cotton Farm. Farmers' Bulletin 1015.
Ways of Making Southern Mountain Farms more Productive. Farmers' Bulletin 905.
What is Farm Management? B. P. I. Bulletin 259.

- A Study of the Tenant Systems of Farming in Yazoo-Mississippi Delta. Department Bulletin 337.
- Value to the Farm Family of Food, Fuel, and Use of House. Department Bulletin 410.
- Farming in the Blue Grass Region. Department Bulletin 482.
- An Economical Study of Farming in Sumter County, Ga. Department Bulletin 492.
- Farm Practice in the Cultivation of Cotton. Department Bulletin 511.
- The Seasonal Distribution of Labor in Chester County, Pa. Department Bulletin 528.
- The Business of 10 Dairy Farms in the Blue Grass Region of Kentucky. Department Bulletin 348.
- A Farm Management Survey in Brooks County, Ga. Department Bulletin 648.
- A Farm Management Study in Anderson County, S. C. Department Bulletin 651.
- Influence of a City on Farming. Department Bulletin 678.
- A Study of Farming in Southwestern Kentucky. Department Bulletin 713.
- A Farm Management Study of Cotton Farms of Ellis County, Tex. Department Bulletin 659.



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